IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application

Applicant(s)	Bolle et al.
Docket No.:	YOR919990588US3
Serial No.:	10/653,804
Filing Date:	September 3, 2003
Group:	2623
Examiner:	Mehrdad Dastouri

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>
> Signature: _____ Date: <u>October 26, 2005</u>

Title: System and Method for Distortion Characterization in Fingerprint and Palm-Print Image Sequence and Using this Distortion as a Behavioral Biometrics

TRANSMITTAL OF APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith are the following documents relating to the above-identified patent application:

1. Appeal Brief; and

2. Copy of Notice of Appeal, filed on August 24, 2005, with copy of stamped return postcard indicating receipt of Notice by PTO on August 26, 2005.

There is an additional fee of $500 due in conjunction with this submission under 37 CFR §1.17(c). Please charge **IBM Corporation's Deposit Account No. 50-0510** the amount of <u>$500</u> to cover this fee. In the event of non-payment or improper payment of a required fee, the Commissioner is authorized to charge or to credit **IBM Corporation's Deposit Account No. 50-0510** as required to correct the error. A duplicate copy of this letter is enclosed.

Respectfully submitted,

Dated: October 26, 2005

Kevin M. Mason
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Reg. No. 36,597
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

5 **Patent Application**

Applicant(s):	Bolle et al.
Docket No.:	YOR919990588US2
Serial No.:	10/653,804
10 Filing Date:	September 3, 2003
Group:	2623
Examiner:	Mehrdad Dastouri

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Signature: _____ Date: October 26, 2005

Title: System and Method for Distortion Characterization in Fingerprint and
15 Palm-Print Image Sequences and Using This Distortion as a Behavioral
Biometrics

20

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
25 P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

30 Applicants hereby appeal the final rejection dated May 24, 2005, of claims

1 through 14 of the above-identified patent application.

REAL PARTY IN INTEREST

The present application is assigned to International Business Machines

35 Corporation, as evidenced by an assignment recorded on March 28, 2000 in the United

States Patent and Trademark Office at Reel 010709, Frame 0381. The assignee,

International Business Machines Corporation, is the real party in interest.

RELATED APPEALS AND INTERFERENCES

40 There are no related appeals and interferences.

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STATUS OF CLAIMS

Claims 1 through 14 are pending in the above-identified patent application. Claims 1-3, 7-9, 13, and 14 remain rejected under 35 U.S.C. § 103(a) as being unpatentable over Westerman et al. (United States Patent No. 6,323,846; hereinafter Westerman) in view of Pu et al. (United States Patent No. 5,933,515; hereinafter Pu). The Examiner has indicated that claims 10 – 12 are allowed and that claims 4 – 6 would be allowable if rewritten in independent form including all of the limitations of the base claims.

STATUS OF AMENDMENTS

There have been no amendments filed subsequent to the final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

The present invention is directed to novel biometrics, called dynamic fingerprints and palm-prints, for authentication. The novel biometrics are consecutive traditional print images where the subject physically changes the appearance of the print images by rotating the finger or palm (page 12, line 11, to page 13, line 26). That is, it is a sequence of finger or palm-print images over a short interval of time where the images are modified according to the rotation (page 13, lines 7-26). The rotational component of the sequence of print images is determined from the image-to-image flow. This flow is either computed from motion-compensation vectors of the sequence compressed in MPEG format or directly from the uncompressed images (page 13, line 7, to page 19, line 4).

STATEMENT OF GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-3, 7-9, 13, and 14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Westerman in view of Pu.

ARGUMENT

Rejection of Independent claim 1, 7, 13 and 14

    The Examiner rejected claims 1, 7, 13, and 14 under 35 U.S.C. § 103(a) as being unpatentable over Westerman et al. in view of Pu et al. In the Office Action dated September 9, 2004, the Examiner acknowledges that Westerman does not disclose a sequence of print images, but asserts that it is well known to extract motion information from various image sequences, and that Pu teaches that it is known to acquire and store a sequence of discrete print images from a part of a hand moving during a period of time. In the final Office Action dated May 24, 2005, the Examiner then asserts that Westerman discloses acquiring a sequence of discrete images.

    First, as the Examiner originally acknowledged, Westerman does not disclose a *sequence of print images*. Thus, Applicants respectfully submit that Westerman does not suggest or disclose "acquiring and storing a sequence of discrete *print* images from a part of a hand," determining position and orientation of the discrete *print* images of said part of the hand as a function of time, and determining distortion of the discrete *print* images as a function of time due to change in position and orientation (emphasis added) as required by independent claim 1.

    Second, Applicants note that Westerman is directed to "apparatus and methods for simultaneously tracking multiple finger and palm contacts as hands approach, touch, and slide across a proximity-sensing, compliant, and flexible multi-touch surface." Abstract of Westerman. Westerman discloses "an electronic system which minimizes the number of sensing electrodes necessary to obtain proximity images with such resolution that a variety of hand configurations can be distinguished." (Column 7, lines 4 – 8.) In general, the techniques of Westerman are used to *input data* (see Abstract of Westerman, for instance) and *not for identifying or authenticating an individual*. Pu, on the other hand, *is* directed to authenticating the identity of a person. Applicants could find no disclosure or suggestion to combine Westerman and Pu and, given the areas to which each patent is directed, a person of ordinary skill in the art would not look to combine Westerman and Pu.

    Third, the Examiner points to column 43, lines 54 – 57 as indicating Westerman's disclosure of determining a distortion of images as a function of time due to

change in position and orientation. However, the cited text describes hand rotational velocity, determined from a change in angle between the innermost and outermost fingers (see column 43, lines 40 – 45). Westerman does not disclose or suggest determining a distortion of images as a function of time due to change in position and orientation. Similarly, Pu, also, does not disclose or suggest determining a distortion of images as a function of time due to change in position and orientation. Conversely, in independent claim 1, the distortion *is* determined from discrete print images. Thus, neither Westerman nor Pu disclose or suggest determining a distortion of images as a function of time due to change in position and orientation, wherein the distortion is determined from discrete print images, as required by independent claim 1.

In fact, Applicants respectfully submit that Westerman teaches away from the limitations of independent claim 1. In FIGS. 2, 3A, 3B, and 4A, Westerman discloses a device that outputs a voltage dependent on the proximity of a touch device (e.g., a finger) to a conductive sense electrode. See column 14, lines 45 – 48, for instance. FIG. 6, for example, of Westerman discloses an array of such devices. Westerman classifies hand motions in order to integrate typing, resting, pointing, scrolling, 3D manipulation, and handwriting into a computer input device (see Abstract of Westerman), and manipulation of discrete print images is unlikely to help or perhaps will even hinder this integration.
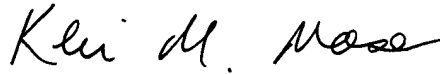
Thus, Westerman and Pu, alone or in combination, do not suggest or disclose all elements of independent claims 1, 7, 13, and 14.

Conclusion

The rejections of the cited claims under section 103 in view of Westerman and Pu, alone or in any combination, are therefore believed to be improper and should be withdrawn. The remaining rejected dependent claims are believed allowable for at least the reasons identified above with respect to the independent claims.

The attention of the Examiner and the Appeal Board to this matter is appreciated.

Respectfully,

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Kevin M. Mason

Date: October 26, 2005

Kevin M. Mason
Attorney for Applicant(s)
Reg. No. 36,597

10

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APPENDIX

1. A biometrics system comprising:

an acquisition device for acquiring and storing a sequence of discrete print images from a part of a hand moving during a time period;

a trajectory process that determines the position and orientation of the images of said part of the hand as a function of time during the time period; and

an estimator process that determines a distortion of the discrete print images as a function of time due to the change in position and orientation, wherein the estimator process determines distortion by determining at least a motion of an image pattern occurring in one or more blocks of at least two of the discrete print images.

2. A system, as in claim 1, where the part of the hand includes one or more of the following: a fingerprint and a palm-print.

3. A system, as in claim 1, where the distortion is caused by one or more of the following: rotation, translation, and shear.

4. A system, as in claim 1, where the motion is interframe motion and where the estimator process comprises the steps of:

determining one or more blocks of interframe motion between consecutive pairs of the images in the sequence;

determining a proportion of blocks with no motion to blocks with some motion;

using the proportion to select a set of candidate distorted images;

identifying a largest stationary and spatially contiguous block in each candidate distorted image in the set;

estimating a global affine transformation between every pair of candidate distorted images in the set about the stationary and contiguous block;

determining a curl and translation from the global affine transformation between every pair of candidate distorted images in the set, and

using the change of the curl over the time period to indicate the distortion.

5. A system, as in claim 4, where, when the change in curl over the time period is greater than a threshold, the distortion is caused by one or more of the following: rotation, translation, and shear.

6. A system, as in claim 4, where the distortion is primarily translation when curl is within a second threshold of zero and the translation exceeds a third threshold.

7. A method for detecting the distortion of a fingerprint or palm-print, comprising the steps of:

acquiring and storing a sequence of discrete print images from a part of a hand moving during a time period;

determining the position and orientation of the images of said part of the hand as a function of time during the time period; and

determining a distortion of the discrete print images as a function of time due to the change in position and orientation, wherein the step of determining a distortion further comprises the step of determining at least a motion of an image pattern occurring in one or more blocks of at least two of the discrete print images.

8. The method of claim 7, where the part of the hand includes one or more of the following: a fingerprint and a palm-print.

9. The method of claim 7, where the distortion is caused by one or more one or more of the following: rotation, translation, and shear.

10. A method for determining a distortion of a set of images as a function of time due to the change in position and orientation of a hand comprising the steps of:

determining one or more blocks of interframe motion between consecutive pairs of images in a sequence of images from a part of a hand moving during a time

period;

determining a proportion of blocks with no motion to blocks with some motion;

using the proportion to select a set of candidate distorted images;

5 identifying a largest stationary and spatially contiguous block in each candidate distorted image in the set;

estimating a global affine transformation between every pair of candidate distorted images in the set about the stationary and contiguous block;

determining a curl and translation from the global affine transformation

10 between every pair of candidate distorted images in the set; and

using the change of the curl over the time period to indicate the distortion.

11. The method of claim 10, where, when the change in curl over the time period is greater than a threshold, the distortion is caused by one or more of the

15 following: pure rotation, translation, and shear.

12. The method of claim 10, where the distortion is primarily translation when curl is within a second threshold of zero and the translation exceeds a third threshold.

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13. A biometrics system comprising:

an acquisition device for acquiring and storing a sequence of discrete images from a part of a hand moving during a time period;

a trajectory process that determines the position and orientation of the

25 images of said part of the hand as a function of time during the time period;

an estimator process that determines a distortion of the discrete images as a function of time due to the change in position and orientation, wherein the estimator process determines distortion by determining at least a motion of an image pattern occurring in one or more blocks of at least two of the discrete print images; and
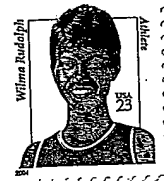
30 identifying a person utilizing at least said determined distortion.

14. A biometrics system comprising:

an acquisition device for acquiring and storing a sequence of discrete images from a part of a hand moving during a time period;

a trajectory process that determines the position and orientation of the images of said part of the hand as a function of time during the time period;

an estimator process that determines a distortion of the discrete images as a function of time due to the change in position and orientation, wherein the estimator process determines distortion by determining at least a motion of an image pattern occurring in one or more blocks of at least two of the discrete print images; and

authenticating a person utilizing at least said determined distortion.

EVIDENCE APPENDIX

There is no evidence submitted pursuant to § 1.130, 1.131, or 1.132 or entered by the Examiner and relied upon by appellant.

RELATED PROCEEDINGS APPENDIX

There are no known decisions rendered by a court or the Board in any proceeding identified pursuant to paragraph (c)(1)(ii) of 37 CFR 41.37.
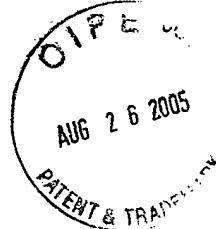
Ryan, Mason & Lewis, LLP
ATTORNEYS AT LAW
1300 POST ROAD
SUITE 205
FAIRFIELD, CT 06824

Receipt in the USPTO is hereby acknowledged of:

Transmittal Letter – (Original & 1 copy)
Notice of Appeal - (Original & 1 copy)

August 24, 2005
Serial No.: 10/653,804
YOR919990588US3
1500-380CON (KMM)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application

Applicant(s)	Bolle et al.
Docket No.:	YOR919990588US3
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Filing Date:	September 3, 2003
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>
> Signature: _____ Date: August 24, 2005

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TRANSMITTAL LETTER

Mail Stop AF
Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith is the following document relating to the above-identified patent application:
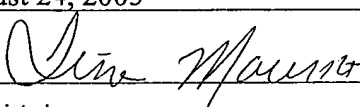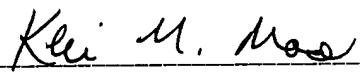
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Respectfully submitted,

Dated: August 24, 2005

Kevin M. Mason
Attorney for Applicant(s)
Reg. No. 36,597
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1300 Post Road, Suite 205
Fairfield, CT 06824
(203) 255-6560

NOTICE OF APPEAL FROM THE EXAMINER TO THE BOARD OF PATENT APPEALS AND INTERFERENCES	Docket Number (Optional) YOR919990588US3

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Assistant Commissioner for Patents, Washington D.C. 20231" on August 24, 2005 . Signature_____ . Typed or printed name_____ Tina Maurice _____ .	In re Application of Bolle et al.

	Application Number 10/653,804	Filed September 3, 2003
	For System and Method for Distortion Characterization in Fingerprint and Palm-Print Image Sequence and Using this Distortion as a Behavioral Biometrics	
	Group Art Unit 2623	Examiner Mehrdad Dastouri

Applicant hereby **appeals** to the Board of Patent Appeals and Interferences from the last decision of the examiner.

The fee for this Notice of Appeal is (37 CFR 1.17(b)) $ 500.00 .

☐ Applicant claims small entity status. See 37 CFR 1.27. Therefore, the fee shown above is reduced by half, and the resulting fee is: $_____ .

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Commissioner has already been authorized to charge fees in this application to a Deposit Account. I have enclosed a duplicate copy of this sheet.

☑ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No._____ 50-0510 _____. I have enclosed a duplicate copy of this sheet.

☐ A petition for an extension of time under 37 CFR 1.136(a) (PTO/SB/22) is enclosed.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)

☑ attorney or agent of record.

☐ attorney or agent acting under 37 CFR 1.34(a). Registration number if acting under 37 CFR 1.34(a)._____ .

_____
Signature

_____Kevin M. Mason_____
Typed or printed name

_____August 24, 2005_____
Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☐ *Total of 1 forms are submitted.

NOTICE OF APPEAL FROM THE EXAMINER TO THE BOARD OF PATENT APPEALS AND INTERFERENCES	Docket Number (Optional) YOR919990588US3

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In re Application of Bolle et al.		
Application Number 10/653,804	Filed September 3, 2003	
For System and Method for Distortion Characterization in Fingerprint and Palm-Print Image Sequence and Using this Distortion as a Behavioral Biometrics		
Group Art Unit 2623	Examiner Mehrdad Dastouri	

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Signature

Kevin M. Mason
Typed or printed name

August 24, 2005
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